

O. Z. Bianco, of the Royal University of Turin, now sends us a quotation from Schopenhauer's dissertation "Ueber den Willen in der Natur" to show that the German metaphysician accepted Herschel's speculation as to the cause of motion of inorganic matter under the influence of gravitation. Dr. Bianco deals with the same subject in a paper entitled "Schopenhauer e la gravitazione universale," published in the *Rivista Filosofica* in 1906.

THE *Physical Review* for October contains a paper by Prof. E. F. Nichols and Dr. W. S. Day on new groups of residual rays in the long wave spectrum. The substances tested were rock salt, ammonium chloride, witherite (barium carbonate), and strontianite (strontium carbonate). The radiation from a group of Nernst burners was reflected in succession from five plane surfaces of one of these materials, and, after passing through a spectrometer composed of concave silvered mirrors and a wire diffraction grating, fell on a Nicholls radiometer, the deflection of which could be observed. The residual wave-lengths found are:—for rock salt, 52.3; for ammonium chloride, 51.4; for witherite, 46.0; and for strontianite,  $43.2 \times 10^{-5}$  centimetre.

A LARGE part of the November number of the *Physikalische Zeitschrift* is devoted to the papers read at the *Versammlung deutscher Naturforscher und Aerzte* at Cologne in September. Amongst a number of interesting communications, we note one from Dr. J. Classen, of Hamburg, on the value of the quotient electric charge by mass for the cathode rays. His method is that of Kaufmann, in which the velocity of the electron is taken to be that due to its passage through the electric field between cathode and anode, and the effect of a magnetic field on the path of the electron is measured. In Dr. Classen's experiments a Wehnelt cathode is situated a millimetre in front of a large anode with a hole a millimetre diameter at its centre, and the discharge tube is placed in a magnetic field due to two large coils arranged in the Helmholtz manner. The deflections of the rays are determined photographically. The value of the quotient obtained is  $1.77 \times 10^7$ , i.e. considerably less than the  $1.86 \times 10^7$  obtained by Kaufmann.

We have received a copy of the "Guide-annuaire de Madagascar et Dépendances" for the year 1908. This official publication contains a complete list of Government officials in the various provinces of Madagascar, and much valuable statistical information.

We have received from Messrs. John Wheldon and Co., of Great Queen Street, London, a copy of a catalogue of 800 books and papers on cryptogamic botany which they offer for sale. The books are catalogued alphabetically by authors' names under the headings *algæ*, *fungi*, *lichens*, *musci* and *hepaticæ*, *filices*, and general.

MESSRS. SPOTTISWOODE AND CO. have sent us a copy of the autobiography of the late Sir Edward Frankland, which was edited and concluded by his two daughters, and printed for private circulation in 1902, under the title "Sketches from the Life of Edward Frankland." Copies of this interesting volume may now be obtained from Messrs. Spottiswoode at the price of 3s. 6d. net.

THE first two numbers have reached us of *Pathologica*, a new bi-monthly journal devoted to pathology, and having a strong editorial committee. The journal includes original articles, abstracts of recent publications, and reviews of books; it is published by Luigi Griffini, Genoa.

NO. 2042, VOL. 79]

## OUR ASTRONOMICAL COLUMN.

WATER VAPOUR IN THE ATMOSPHERE OF MARS.—A telegram from Prof. Lowell, published as Circular No. 106 of the Kiel Centralstelle, reads as follows:—"Quantitative measures by Very, with his new spectral comparator, of Slipher's spectrograms Mars mmron (?), show little a water vapor band twenty-two per cent. stronger in Mars spectrum than in our own air. Solar lines C equal.—Lowell."

Our readers will remember that early in the present year Mr. Slipher photographed the spectrum of Mars in which the a water-vapour band was considerably stronger, relatively, than in a similar spectrum of the moon, both spectra being taken when the objects were at about the same altitude (see NATURE, vol. lxxvii., No. 2002, March 12, p. 442). It is to these photographs, presumably, that the above message refers, the queried word probably meaning "moon."

ACCELERATION OF MATTER IN THE TAIL OF MOREHOUSE'S COMET.—In a paper published in No. 22 of the *Comptes rendus* (November 30, p. 1033), MM. Baldet and Quéniisset give further details concerning the accelerating velocities of the agglomerations seen, on their photographs, in the tail of comet 1908c.

Between September 17 and November 6 ninety-six photographs were obtained, with six different cameras, at the Juvisy Observatory, and, on examining these, it is quite possible to recognise the same features of the tail on photographs taken at different times on the same night and also on those taken on successive nights.

The photographs taken on October 15 and 16, with an interval of nineteen hours, afford a good example. Measures made on that of October 15 showed that a luminous mass, then some 580,000 km. from the head, was travelling at a velocity of about 14 km. per sec. The same mass was easily recognisable on the photograph of October 16, and the measures showed that it was then about 2,200,000 km. from the head, that is to say, it had travelled 1,600,000 km. during the interval; had 14 km. been maintained as a uniform velocity, the distance covered would have been only 960,000 km. Measures made on two plates taken on October 15, with an interval between the exposures of 1h. 40m., showed that another similar luminous mass was travelling at the velocity of 58 km. per sec.

Other peculiarities in the tail are also noted, and in one of the two photographs which accompany the paper there is a remarkable deflection in the tail, not far from the head, which seems to indicate that the ejected matter had encountered some such obstructing medium as would be provided by meteoritic debris.

The peculiar changes of the comet's appearance are also reviewed by Prof. Barnard in No. 4, vol. xxviii., of the *Astrophysical Journal* (p. 292, November). With three cameras, Prof. Barnard secured 190 negatives, which show very strikingly how rapidly the enormous changes in the comet's appearance took place. Two photographs reproduced with the paper were taken on September 30 and October 1 respectively, the interval between the exposures being barely twenty-four hours; yet the general appearance of the tail was utterly transformed during that interval.

CHARACTERISTICS OF THE SUPERIOR ( $K_3$ ) LAYER OF THE SUN'S ATMOSPHERE.—In a paper published in No. 22 of the *Comptes rendus* (November 30, p. 1016), M. Deslandres states that by employing a large spectroheliograph of a special type he has succeeded in obtaining photographs with the pure radiation ( $K_3$ ) of the highest layer of the sun's atmosphere. In previous work the calcium radiation,  $K_3$ —the central dark reversal of the calcium K line—has always been mixed with varying proportions of the bright ( $K_2$ ) reversals which bound it on either side, consequently the photographs have shown the integrated phenomena of the highest layer and the layer immediately below it; but in the new photographs those phenomena peculiar to the upper layer are shown alone. The favourable weather of the last four months has permitted a fine set of such photographs, extending over four rotations of the sun, to be obtained.

The principal characteristic of the  $K_3$  images is the appearance of the long dark lines, which M. Deslandres has called *filaments*, joined up by the less conspicuous and less continuous lines designated *alignements*; these apparently intersect at particular points, three or four of them cutting each other in the same place. Then there are large, dark patches, some of which appear to lie above faculæ, whilst others are either attached to filaments or are independent.

Some of these filaments have been observed to persist in the same heliographic positions for several rotations, just as do spots in the lowest level, and this leads to the suggestion that spots and filaments are simply manifestations of the same cyclonic motions in different parts of the circulation. The analogy to terrestrial cyclonic movements is shown to be very close, and it is suggested that the closer study of the solar may throw valuable light upon the working of the terrestrial *tourbillons*.

**LIVERPOOL ASTRONOMICAL SOCIETY.**—The report of the Liverpool Astronomical Society for the session 1907–8 contains a number of papers read by various members during the session; amongst them is the president's address, in which Mr. Plummer gave an interesting description of the motion of Halley's comet and the various methods by which it has been investigated. Papers were also read by Mr. Reynolds, describing the large reflector which he has set up at Birmingham and also the one he presented to the Helwan Observatory, and Father Cortie, whose discourse dealt with the maintenance of the sun's heat.

**ONE HUNDRED NEW DOUBLE STARS.**—Bulletin No. 144 from the Lick Observatory is devoted to a list of 100 new double stars discovered by Dr. R. G. Aitken. This is the thirteenth list of its kind, bringing the total number of "Aitken" doubles to 1900, and it includes closer companions to the previously known doubles  $\Sigma$  22,  $\Sigma$  339, O $\Sigma$  (App.) 41, O $\Sigma$  87, S. 461,  $\beta$  627, and  $\Sigma$  31.

#### PRIZE AWARDS OF THE PARIS ACADEMY OF SCIENCES FOR 1908.

**AT** the annual meeting of the academy, held on December 7, the president announced the prize awards as follows:—

**Geometry.**—The grand prize of the mathematical sciences is divided in equal parts between Luigi Bianchi and C. Guichard; the Francœur prize is awarded to Émile Lemoine, for his work taken as a whole; the Poncelet prize to Prof. Fredholm, of Stockholm, for his researches on integral equations.

**Mechanics.**—The Montyon prize (mechanics) is awarded to E. Lebert. No memoir was received by the academy on the subject proposed for the Fourneryon prize (the theoretical or experimental study of steam turbines).

**Navigation.**—The extraordinary prize for the navy is divided between M. Labeuf (2500 francs), for his work on submarines, M. Dunoyer (2500 francs), for his electromagnetic compass, and M. Dautriche (1000 francs), for his work on the influence of alkaline salts on the power of explosive materials; the Plumey prize is divided between M. Codron (1500 francs), for his work on machine tools, M. Marchis (1500 francs), for his work on the use of poor gas and the production and application of low temperatures, and MM. Fortant and Le Besnerais (1000 francs), for their memoir on the oscillations of water along a vertical wall.

**Astronomy.**—The Pierre Guzman prize is not awarded. The Lalande prize is divided between W. L. Elkin and F. L. Chase, for their researches on the determination of stellar parallax, M. F. Smith receiving a mention; the Valz prize is awarded to Michel Luizet, for his researches on terrestrial magnetism, atmospheric electricity, and variable stars. No memoir has been received on the subject proposed for the Damoiseau prize (the theory of the minor planet Eros based on known observations). Pierre Puiseux receives the Janssen prize for the whole of his astronomical work.

**Geography.**—The Gay prize is divided unequally between Louis Gentil, for his topographical and geological work in Morocco, Prosper Larras, Abel Larras, and Marcel

Traub, for surveying work in the same country; the Tchihatchef prize is awarded to Lieut.-Colonel Bernard, for his memoir on the delimitation of the Franco-Siamese frontier; the Binoux prize is divided between Paul Heilbronner, for his memoir on the geometrical description of the French Hautes Alpes, and Jules Richard, for his works and book on oceanography. Mentions are attributed to MM. Mazeran and René Bossière. The Delalande-Guérineau prize is awarded to Auguste Chevalier, for his researches on the flora and economical resources of tropical Africa.

**Physics.**—André Blondel receives the Hébert prize, for his researches on the electric arc; Marcel Brillouin the Hughes prize, for his book on the viscosity of liquids and gases.

**Chemistry.**—The Jecker prize is awarded to Ph. Barbier, for his researches in organic chemistry; the Cahours prize to MM. Gain and Pierre Carré (in equal parts); Montyon prizes (unhealthy trades) to A. Frois, for his work on dust arising in industrial occupations, and Georges Claude, for his practical applications of liquid gases; the Berthelot prize to M. Fosse; the Fontannes prize to M. Pervinquier; the Bordin prize to F. Priem and M. Leriche.

**Botany.**—The Desmazières prize is not awarded, but M. Hariot and Mlle. Belèze receive honourable mentions; the Montagne prize is awarded to Ernest Pinoy, for his studies in the myxomycetes; the De Coincy prize to Paul Guérin.

**Anatomy and Zoology.**—For his work on the Coleoptera, Pierre Lesne receives the Savigny prize; Jules Bourgeois the Thore prize, for the whole of his entomological work.

**Medicine and Surgery.**—Montyon prizes are awarded to MM. Frouin, Tissot, Carré, and Vallée, and MM. Rennes, Chevassu, and Joly are accorded mentions, MM. Georges Rosenthal, Adrien Lippmann, and Soubies citations. The Barbier prize is awarded jointly to MM. Piettre and Vila, for their work on the blood of mammals and birds; the Bréant prize (interest, in equal parts) between MM. Vincent and Remlinger; the Godard prize to MM. Lamy and Mayer jointly, for their studies on the mechanism of urinary secretion; the Baron Larrey prize to Dr. Bonnette, for his memoir on the dangers attending the use of blank cartridge; the Bellion prize to M. Basset, for his book on pathological anatomy, J. Alquier receiving an honourable mention. The Mège prize is not awarded. The Serres prize is accorded to Albert Brachet, for the whole of his work on embryogeny.

**Physiology.**—The Montyon prize for experimental physiology is divided equally between J. Sellier, for his studies on the comparative physiology of digestion, of muscular contraction, and the special physiology of the encephalus, Henri Pottevin, for his studies on the soluble ferments, and F. X. Lesbre and F. Maignon (jointly), for their contributions to the physiology of the pneumogastric and spinal nerves. The Philipeaux prize is awarded to M. Lafon, for his experimental researches on diabetes and glycogen; the Lallemand prize to G. Pagano, for the whole of his researches on the nervous system; the Martin-Damourette prize to Eugène Collin, for his application of the microscope to the determination of substances of vegetable origin; the Pourat prize to J. Lefèvre, for his studies on the energetics of the animal body.

**Statistics.**—The Montyon prize is divided between MM. Deniker and Felhoen, MM. Risser and Laurent receiving mentions.

**General Prizes.**—Berthelot medals are awarded to MM. Barbier, Gain, Pierre Carré, Frois, and Georges Claude. Charles Frémont receives the Tremont prize and J. H. Fabre the Gegner prize. The Lannelongue prize is divided between Mmes. Béclard, Ruck, Cusco, and de Nabias; the Wilde prize between MM. Tikhoff and Charles Nordmann; the Saintour prize between Paul Gaubert and Émile Rivièrè; the Jérôme Ponti prize between Louis Bedel and Adrien Dollfus; the Houleuvre prize between MM. Debiegne, Petot, and E. Fabry. The Estrade Delcros prize is awarded to Jacques Hadamard; the prize founded by Mme. la Marquise de Laplace to P. M. E. Lancrenon; and the prize founded by M. Félix Rivot to MM. P. M. E. Lancrenon, G. E. A. Chavanes, and R. D. Blanchet.